

Sodium spotted in the atmosphere of distant planet

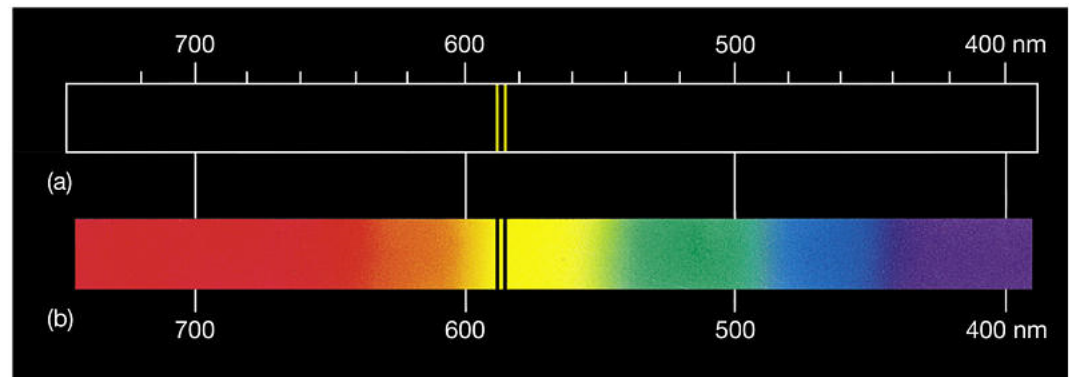
Nov 27, 2001

A chemical has been detected in the atmosphere of an extrasolar planet for the first time. David Charbonneau and Timothy Brown of the National Center for Atmospheric Research in Colorado observed sodium in the atmosphere of the Jupiter-like planet that orbits a Sun-like star known as HD 209458. This is the first direct evidence for an atmosphere on a planet beyond our solar system and is likely to spark many similar searches. Astronomers have detected 76 extrasolar planets to date.

Using the Hubble space telescope, Charbonneau and Brown inspected the planet as it passed in front of its parent star, which is 150 light years away. Light from the star passed through the planet's atmosphere, and the researchers detected the well-known absorption lines of sodium in the yellow region of the spectrum. The 3.5-day orbital period of the planet gave the pair frequent chances to make observations.

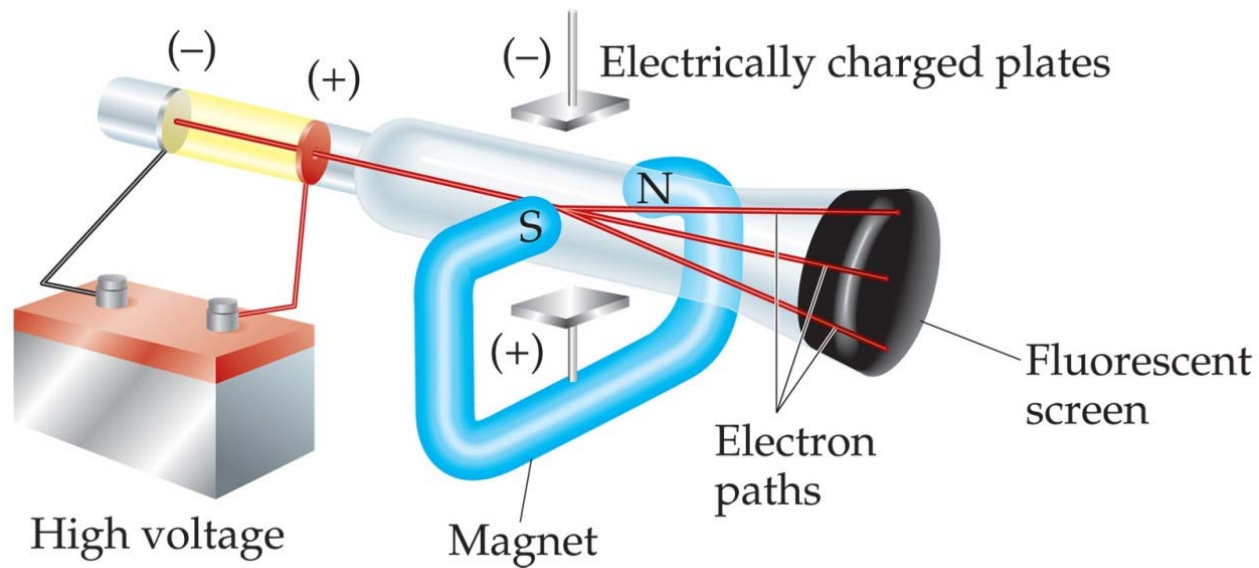


From: physicsworld.com



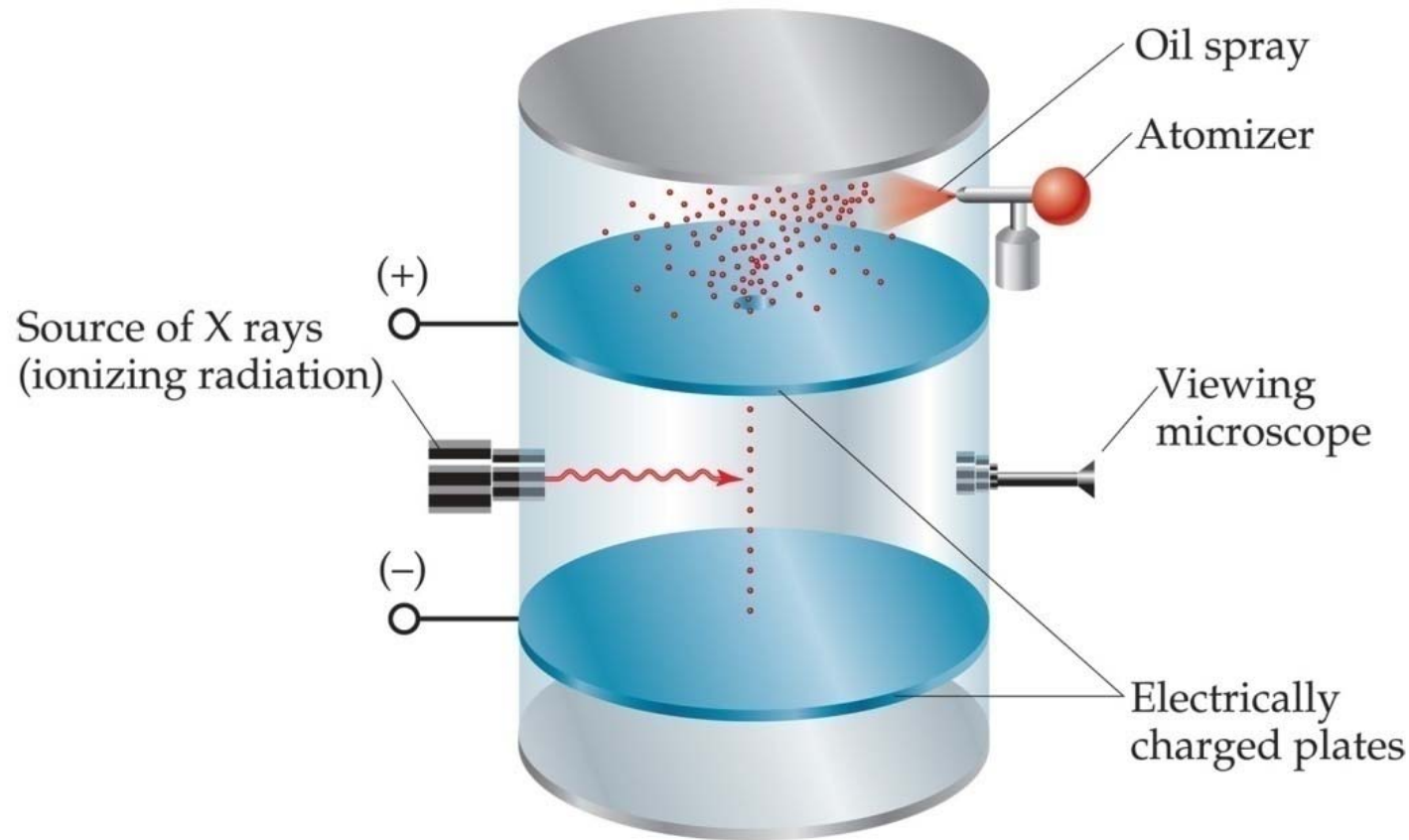
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The Electron



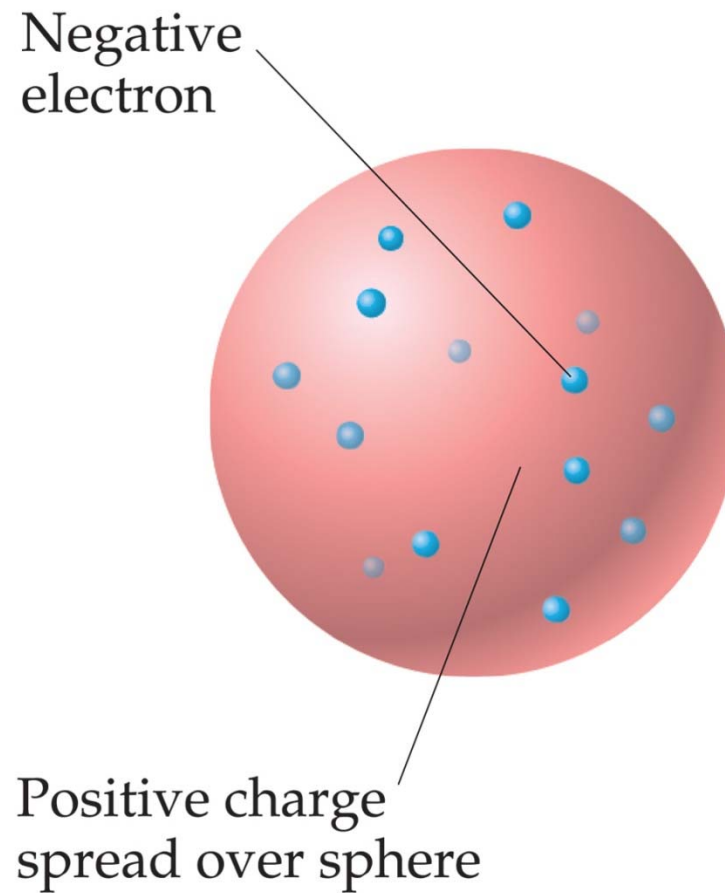
- Streams of negatively charged particles were found to emanate from cathode tubes.
- J. J. Thompson (1897) measured the charge/mass ratio of the electron to be 1.76×10^8 coulombs/g.

Millikan Oil Drop Experiment



Robert Millikan (University of Chicago) determined the charge on the electron in 1909.

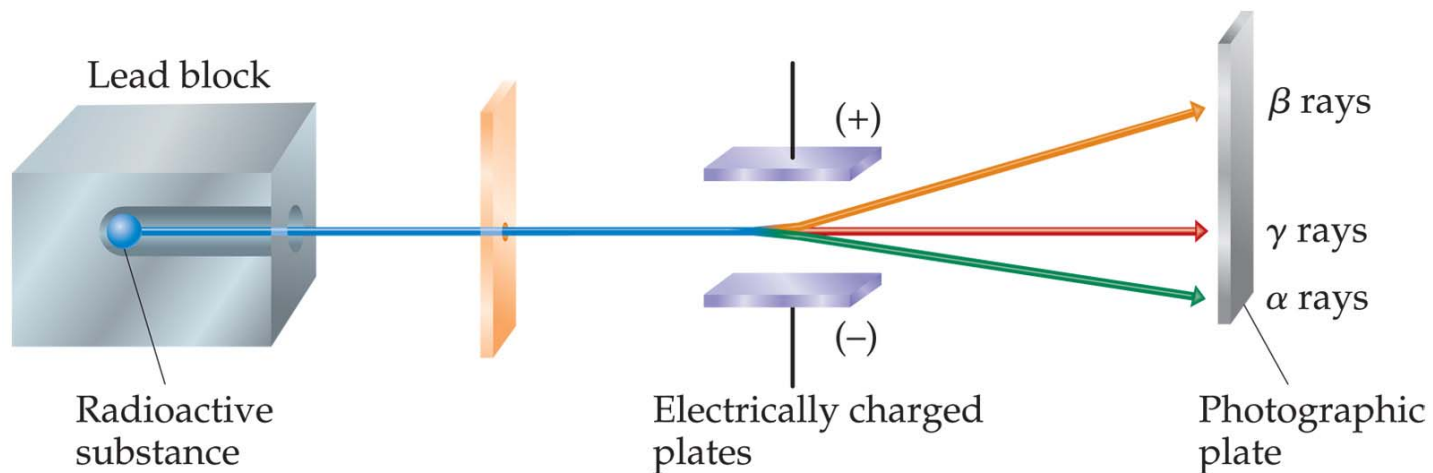
The Atom, circa 1900

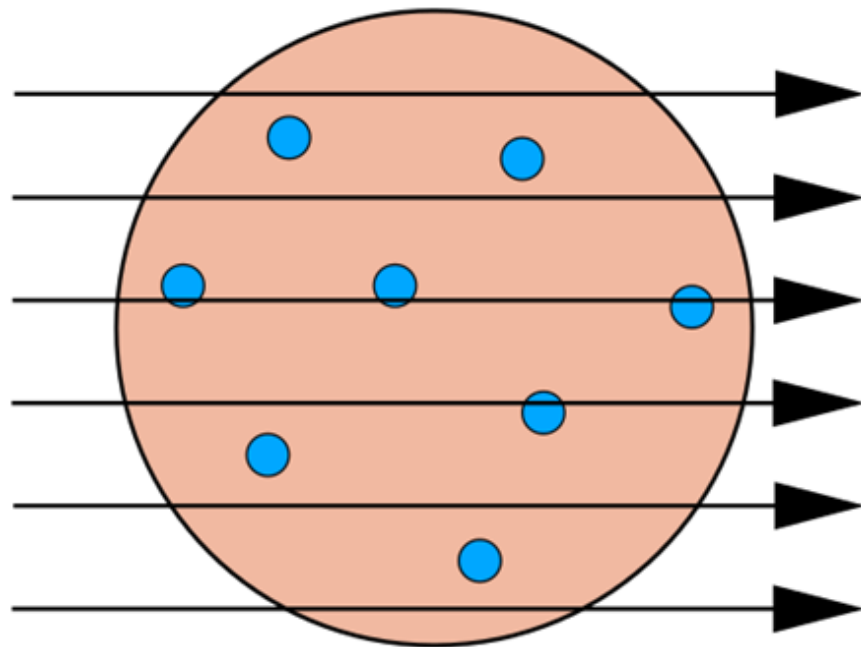


Positive sphere of matter with negative electrons imbedded in it.

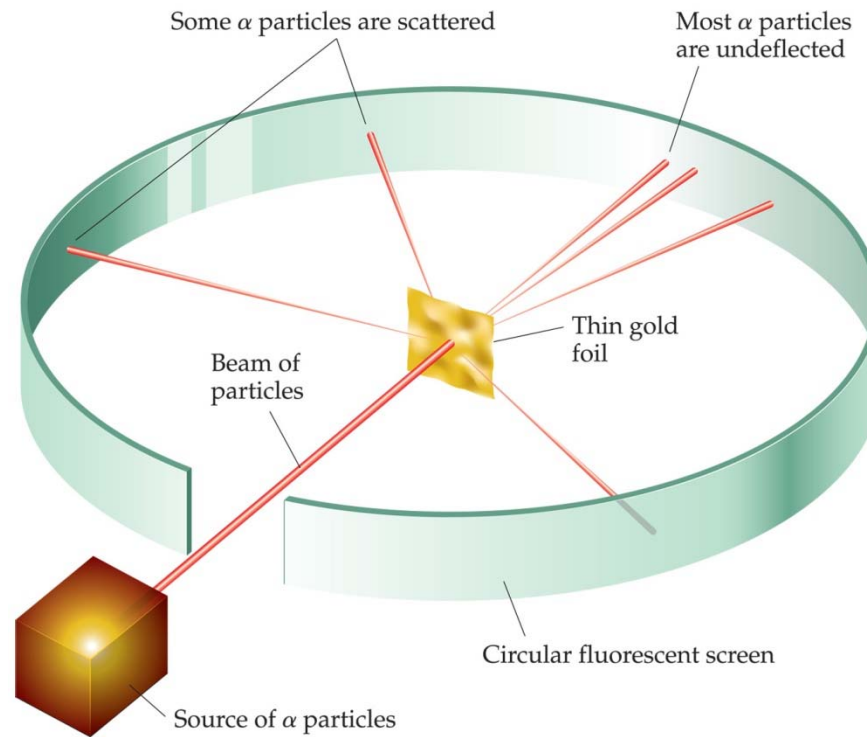
Radioactivity

- Radioactivity is the spontaneous emission of radiation by an atom.
- Three types of radiation were discovered by Ernest Rutherford:
 - α particles
 - β particles
 - γ rays

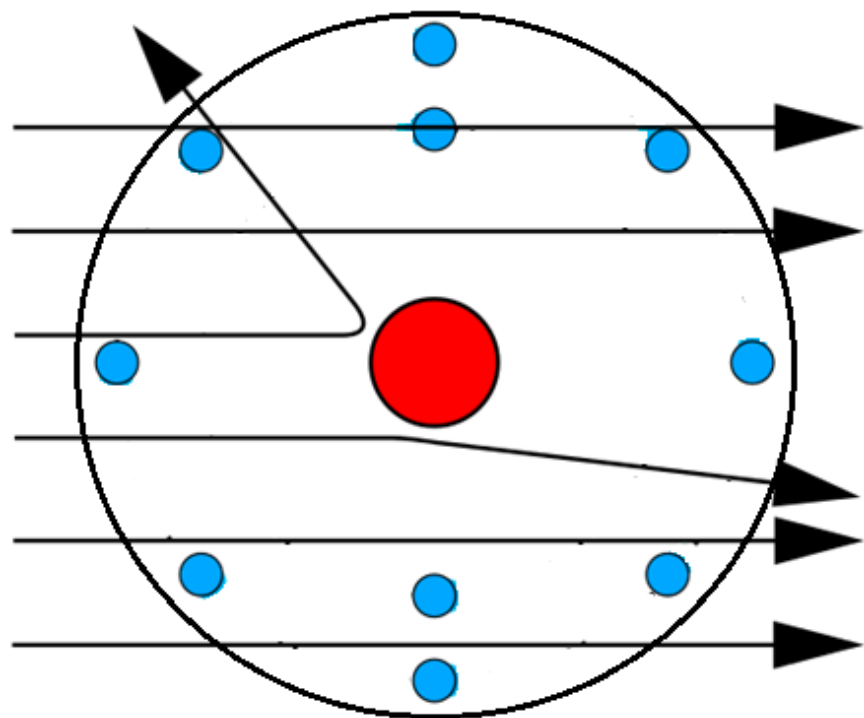
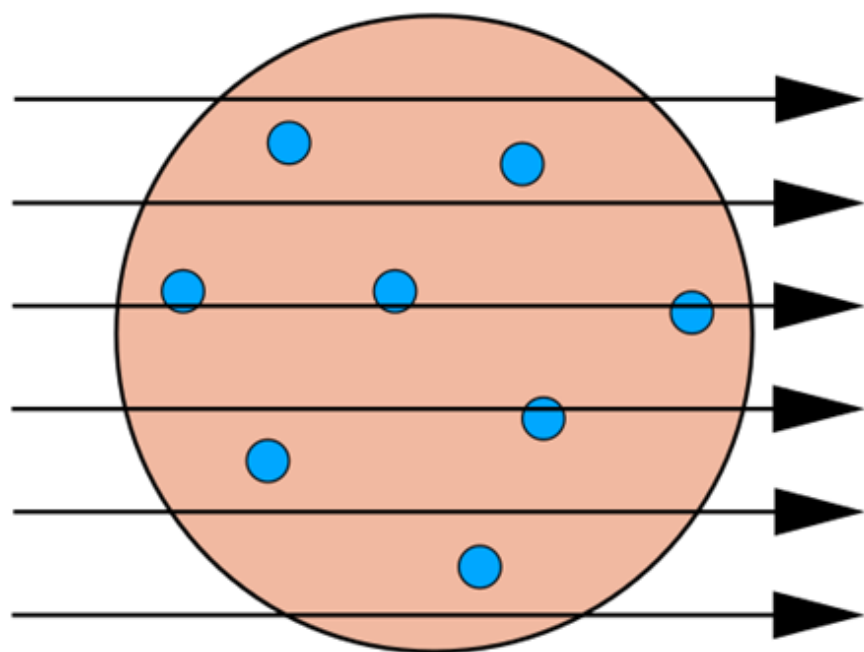




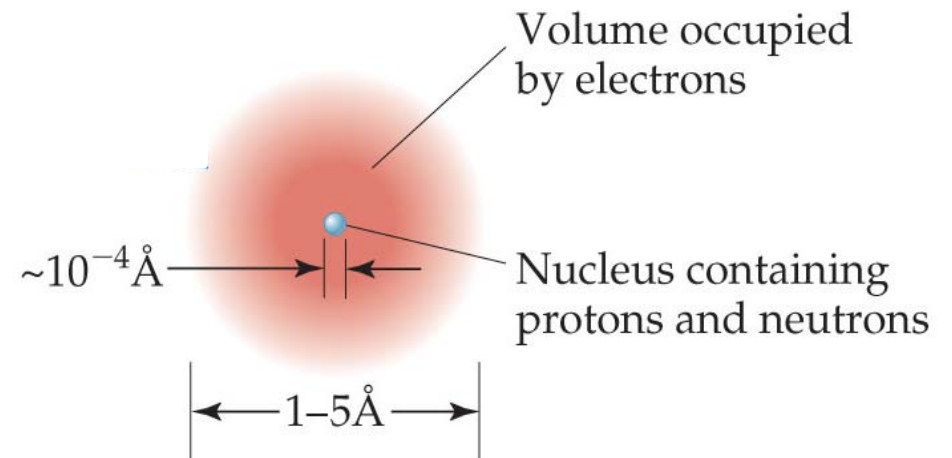
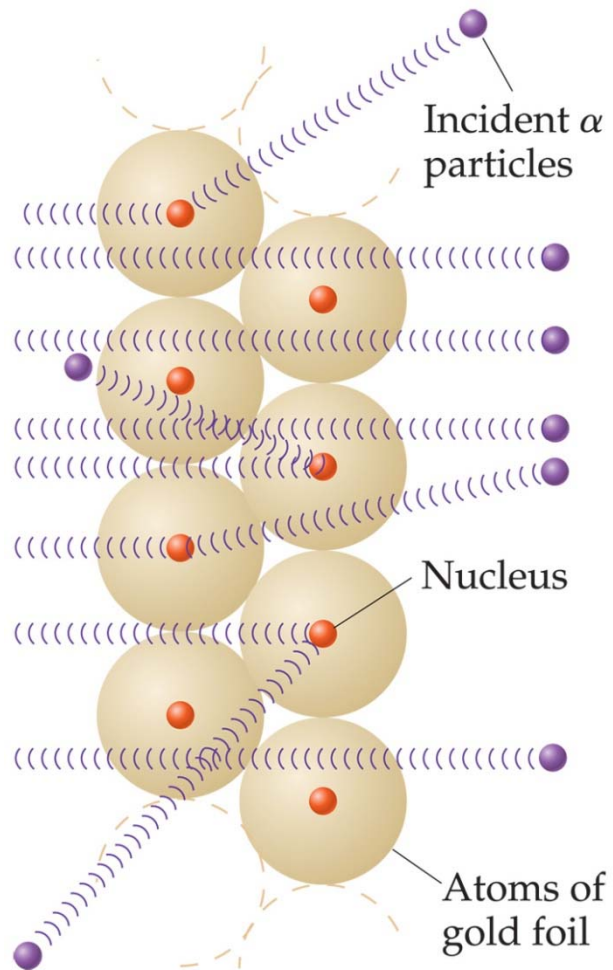
Discovery of the Nucleus



Ernest Rutherford shot α particles at a thin sheet of gold foil and observed the pattern of scatter of the particles.



The Nuclear Atom



Subatomic Particles

Particle	Charge	Mass (amu)
Proton	Positive (1+)	1.0073
Neutron	None (neutral)	1.0087
Electron	Negative (1-)	5.486×10^{-4}

$$1 \text{ amu} = 1.6605 \times 10^{-27} \text{ kg}$$